II. THE SOCIO-POLITICAL AND ECONOMIC FRAMEWORK

II.1 Epidemiologia: cecità ed ipovisione nel mondo oggi

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Epidemiology: Blindness and Low Vision in the World
Dr. Silvio Paolo Mariotti, Director of the Programme for the Prevention of Blindness and Deafness of the WHO, describes the estimates for the year 2010, according to which 285 million people in the world have a grave sight deficit. Of these, 246 million have defective vision and 39 million are blind. As regards this deficit, about 80% of cases are treatable and preventable. Compared to the estimates for 2004, the number of people with defective vision and blind people in the world has decreased by 9%. This is the most recent news because investments for prevention made by governments, institutions, agencies for bilateral help, and NGOs have had an important impact. This reduction has been especially noted in the region of Africa where advances in the development of health-care and social systems have been particularly evident.

However, the fact remains that a large part of the world’s population suffers every day because of a handicap that could, in 80% of cases, be treated or avoided.

The first causes of defective sight in the world are the negative results of uncorrected refraction (in particular in children), whereas the first cause of blindness is cataract that has not been operated on (prevalent in people over the age of fifty). The fact that an increasing number of countries have successfully eliminated pathologies that cause blindness, such as trachoma and river blindness, must encourage investments in initiatives in favour of ocular health. The appeal that is launched is that of carrying on with the pathway of investment in the prevention of blindness and rehabilitation of sight, initiatives that allow us, given present knowledge, to help millions of our brothers and sisters.

S
stimate the number of persons in the world and the distribution of these in the various countries and regions is an essential ingredient for the identification of cases that need to be treated.

Tale compito è svolto sin dagli anni ’90 dall’Organizzazione mondiale della Sanità, che ha pubblicato regolarmente delle stime di quanto persone nel mondo soffra-no di cecità, o siano ipovedenti, e per quali cause principali nelle varie fasce di età.

I dati più recenti, pubblicati nel 2010, stimano in 285 milioni i numeri di persone con un deficit visivo grave nel mondo: di queste, 246 milioni sono ipovedenti e 39 milioni sono cieche.

Dall’esame delle cause di tale deficit, si può evincere che, in oltre l’80% dei casi, questo deficit è curabile e prevenibile. Questo legittima il considerare la cecità evitabile un problema di salute pubblica a livello mondiale.

Le fasce di età non sono tutte interessate nello stesso modo: circa l’80% del deficit visivo si trova tra le persone nella fascia di età oltre i 50 anni; il numero di persone in questa fascia di età è cresciuto del 18% negli ultimi 6 anni, in tutti i paesi del mondo. Di conseguenza ci si attendeva di rilevare un proporzionale aumento del numero di persone con un deficit visivo grave, e invece, rispetto alle stime del 2004, il numero di ipovedenti e ciechi nel mondo è diminuito del 9%.

Questa è un’ottima notizia: vuol dire, in larga parte, che gli investimenti dei governi, delle organizzazio- ni di aiuto allo sviluppo, delle organizzazioni non governative a sostegno di interventi mirati principalmente alla prevenzione della cecità, o all’aiuto allo sviluppo sanitario o sociale hanno avuto un impatto misurabile su larga scala. La riduzione è particolarmente sensibile nella regione africana, dove i progressi nello sviluppo dei sistemi sanitari e sociali sono particolarmente evidenti.

Resta il fatto che una popolazione numerosa quanto un virtuale 4° paese per popolazione al mondo soffre quotidianamente a causa di un handicap che potrebbe, nell’80% dei casi, essere curato o evitato.

Un bambino ogni 5 minuti diventa cieco, ed il 50% dei casi potrebbe essere evitato o curato; i bambini necessitano di specialisti esperti nella gestione delle loro patologie oculari, ma l’investimento nella prevenzione e cura della cecità infantile è un imperativo morale indiscutibile.

La prima causa di ipovisione nel mondo sono i vizi di refrazione non corretti (miopia, ipermetropia
II.2 Increasing Access to Eye Care and Rehabilitation in Developing Countries

DR. WING-KUN TAM
President of Lions Clubs International,
China

It is an honor for me to be here today. I want to thank the Holy Father, the Pontifical Council for Health Care Workers and CBM for convening this study group. This is a great opportunity for people of goodwill to come together to bring sight to the blind and improve the lives of those with vision impairments. I am honored to be among the groups and organizations here who are dedicated to helping others and fighting these challenges together.

What I will talk about today chiefly is the role volunteers can play in reducing blindness and vision impairment. Lions are volunteers with the motto “We Serve,” and are well known for our involvement with vision. I am the international president of Lions Clubs International. In my day job, I run an international cargo company. But what you may not know about me, is that I am just another Lion volunteer, like the other 1.35 million Lions around the world, and I know there are a number of other Lions in the room. So I want to talk about the role volunteers play in combating vision impairment and increasing access to eye care and rehabilitation.

Unfortunately, blindness and vision impairment often is an overlooked challenge. That is very regrettable especially since a majority of vision impairment is a challenge that can be overcome or significantly improved with the right resources. We have the technology. We have the know-how. The challenge is to provide access to eye care.

As we know, 9 of 10 people who are blind or with vision impairment live in developing nations. So it is...
III. THE PRINCIPAL CAUSES OF AVOIDABLE BLINDNESS AND STRATEGIES FOR PREVENTION AND CURE

III.1 Cataract – the Leading Cause of Blindness

What is Cataract?

Cataract is the opacification of the crystalline lens of the eye. It is usually a gradual painless process that takes place over years. And it occurs mainly with increasing age. As such, it is predominantly to be found in elderly people.

However lens opacification may occur due to some ailments/conditions at young or adult age. These are called secondary cataract. Cataract that occurs at birth is called congenital cataract. But most cataract is due to old age, to so-called age related cataract. And this talk will concentrate on this.

The Burden of Cataract

Cataract blindness

In 2010 WHO estimated the total number of blind people in the world at 39.36 million. These are people with vision that is worse than 3/60 (20.400) in their better eye. Of these, cataract is the major cause, being responsible for 51% of blindness. This means that there about 20 million people who are blind because of this condition worldwide. There are another 74 million with some vision loss due to cataract as well.

The number of people who are blind due to cataract varies in different parts and regions of the world as cataract is responsible for over 60% of blindness in some parts of the world.

The incidence of cataract blindness globally is not well known. In 2000 Allen Foster reported a rough estimate of 5 million cataract blind yearly.

Cataract Visual Impairment – Operable Cataract

Cataract blindness is the end spectrum of a gradual progressive vision impairing condition. Cataract often becomes noticeable to a person when it begins to impair his/her vision. At the stage when this visual impairment affects a person normal life and the consulting doctor feel it needs to be operated it is termed ‘operable cataract’. This often is much earlier than the stage when cataract causes the degree of vision impairment called blindness. Thus the number of people with operable cataract is much higher than the number of people with cataract blindness. The level of lens opacity (cataract) that is deemed ‘operable’ varies according to the visual demand of the person, the surgical skills of the doctor, the facilities available, and access to services in the environment.

Many reports, especially in developing countries, often use lens opacity that results in vision of less than 6/60 in the eye as ‘operable cataract’. There is no global data on the number of people or eyes with lens opacity worse than 6/60.

Looking at available data from Africa, Lewellen, using computer modeling and results of RAAB surveys across West and East Africa, recently reported that the prevalence and incidence of cataract opacity amongst fifty-
year-olds and older varies widely even within Africa. The incidence of cataract responsible for vision less than 6/60 in one or both eyes per year varies from 1.1% in Rwanda to 3.4% in Mali. Using the least prevalence and incidence estimates to extrapolate the number of persons with unilateral or bilateral lens opacity of vision 6/60, it was suggested that there were over 5 million people with ‘operable cataract’ in one or both eyes. Furthermore annually there will be another 800,000 more people developing this condition. This is going to increase astronomically due to increase life expectancy and the likely increase in demand for surgery at a much earlier level of visual loss.

So in Africa alone a very conservative estimate suggests that there needs to be about 800,000 cataract surgeries each year only to take care of incidence, without even tackling the backlog of over 5 million people who already have the problem.

Currently the estimated number of cataract surgeries per year in Africa is not exactly known. However the WHO Afro report stated the average CSR in Africa is 467, meaning that the average number of cataract surgeries per year in Africa is about 380,000. This is not even half of the projected incidence.

The Future

The incidence will surely increase as life expectancy is increasing across the world including Africa. Furthermore, as cataract services improve and the literacy and economic status of people improves there will be increased demand for surgery even at less visual acuity than 6/60, and this means that the number of individual operable cataract may triple further if people seek an operation at vision say of 6/24.

Aetiogenesis

Many factors have been implicated as risk factors in cataractogenesis: they include old age, UV rays, smoking, steroids, lean body mass, a dehydration crisis, even cooking. The wide range of risk factors only suggests that we do not really know the risk factors, especially in old age. One other explanation gaining ground currently is the ‘free radical theory’, i.e. cellular damage from reactive oxygen species. Environmental sources of this species included solar radiation, biomass fuels and tobacco smoking. However, antioxidants like vitamins C and E, and the carotenoids lutein and zinc, have not shown consistent benefit in epidemiological studies.3,4

Treatment

For now cataract is treated only by surgery. The procedure involves removing the opaque lens and replacing it with an artificial lens that will provide the refractive function of the natural lens removed. Though different techniques are used the most common and most effective procedure is the phacoemulsification procedure. With improved technology and surgical skills the surgery has not only become very successful in restoring vision but also very fast and simpler.

Why Invest in Cataract Services?

The burden that the blind person is to himself, his family and his community has long been recognized. In economic terms, various studies have demonstrated this amply.

The cost effectiveness of interventions

Cost per DALY saved has been put at $20-40 dollars. This makes cataract surgery and other eye interventions among the most cost effective health interventions.

DALY is a time-based measure that combines years of life lost due to premature mortality and years of life lost due to time lived in states of less than full health.

Interventions for visual disorders are as cost effective as HIV/AIDS interventions, as depicted below.

Economic Returns

a. An economic study in Pakistan reported that rehabilitating cataract blind people has an economic benefit worth $2.5 billion over a 10-year period. This represented about 3.83% of the country’s GDP at that time. The per annum productivity gains from rehabilitating all blind people in Pakistan (mostly cataract) represents 0.8% of GDP, which is higher than the total annual public spending on health.

b. A study on the economic benefit of cataract surgery in three countries (Kenya/Bangladesh/Philippines) showed that cataract surgery can alleviate poverty, especially among the most vulnerable. The research showed that after cataract surgery the average household economic gain in the three countries was US $7 per
capita per month. With an average family size of five, that means US $35 a month or US $420 a year. The average monthly family income in Bangladesh is approximately US $126. Thus households with persons with cataract had 20-28% lower per capita household expenditure than household with people with normal vision. After surgery, per capita household expenditure was similar to controls (those who had not undergone cataract surgery). Cataract surgery increased the number of people involved in productive activities by up to 50%, thus helping to relieve poverty.

In terms of daily activities and time-use the study showed that cataract surgery increased the number of people involved in productive activities by up to 50%, thus helping to relieve poverty.

As regards quality of life before surgery, cataract patients were four times more likely than people with normal vision to report problems with self-care, mobility, usual activities, pain/discomfort and anxiety/depression. After surgery, quality of life improved substantially.

**Interventions**

**So where are we now?**

Since the start of “VISION 2020: The Right to Sight”, the number of cataract surgeries carried out has increased. However, there is still a wide gap between the burden of the pathology and the surgeries being done.

The number of cataract blind people (which is much less than the number of people needing cataract surgery) compared to the number of surgeries done, shows a wide gap in regions like Africa, WPR and SEA. This is demonstrated in the table below:

<table>
<thead>
<tr>
<th>Outreach Type</th>
<th>Main objectives and strategies</th>
<th>Potential for sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Surgical eye camp</td>
<td>– Screen and offer surgery on site to as many people as possible</td>
<td>– Low in general, except where long-term local support and commitment can be guaranteed</td>
</tr>
<tr>
<td>B. Screening eye camp</td>
<td>– Screen, refer/transport candidates for cataract surgery to base unit</td>
<td>– Low, for the same reasons as (A) above Could be justified as a means to build up or strengthen existing eye centers,</td>
</tr>
<tr>
<td>C. Mobile eye clinic</td>
<td>– A toned-down variant of (B), often organized and run as an equivalent of an Outpatient Department (OPD) of the base eye unit</td>
<td>– Same as (B) above</td>
</tr>
<tr>
<td>D. Using/working with community-based rehabilitation (CBR) or other community-based programs</td>
<td>– Use an existing CBR programme to deliver primary eye care, detect, assess and refer or transport – use community-based and -approved workers, e.g. cataract finders or other health workers</td>
<td>– Uncertain when the community is a passive beneficiary of these services and/or when most of the running cost is borne by donors or sponsors – Good to excellent, when true ownership by the community is actively sought and achieved, or some sort of cost-sharing is introduced from the outset</td>
</tr>
<tr>
<td>E. Creating eye (vision) centers strategically located in needy areas</td>
<td>– Here priority is given to the setting up of permanent primary and secondary eye units, with the view to improve geographic coverage and access to eye care</td>
<td>Good to excellent, especially: – When planned and implemented in close partnership with the community; – When combined with other strategies that proactively seek out the needy and ‘hard-to-reach’ patients</td>
</tr>
</tbody>
</table>

**The ‘Impasse’**

The conventional provision of cataract surgeries at hospitals at the current rate will not be able to address this burden of cataract visual impairment, especially in areas where the burden is highest. Over the years various approaches have been developed, especially by NGDOs, to provide mass surgeries for cataract cases in areas of the world with the highest burden, like Africa, Asia and Latin America.

Some of the major approaches provide the services to a larger number of people in a shorter time period and in a less expen-
Current Major Challenges to Cataract Services in Most Developing Countries

Non prioritization of eye care and cataract services by governments.

Alienation of eye care and cataract services from health structures and programs mainly through vertical programs.

Sustainability concerns regarding ‘mass surgery’ programs.

Inadequate efficiency in some programs.

Inadequate resources, e.g. a shortage of human resources.

Less than optimal coverage of services.

Inequity in service provision, e.g. gender imbalance.

Quality concerns in services – less than optimal visual, psychological and quality of life outcomes.

Scaling Up Cataract Services – More Efficient Delivery Service

To cope with increasing burden of cataract vision loss both the traditional hospital based services and the outreach services need to improve in efficiency, quality, innovations and sustainability.

Improving outreach programs:7

Careful planning of the program.

Community involvement and ownership.

Government involvement and leadership.

A good monitoring and evaluation system.

A structure and clear mechanisms for dialogue, problem-solving and co-ordination among all stakeholders.

Improving hospital services:8

Systems must optimize the balance between resources and patient load. The success of the Aravind eye hospital in India in mass surgeries has been attributed to systems in place which include: standardization; division of labor; balancing resources; and micro-level planning.

Measures to Scale Up Cataract Services

Improving efficiency and organization of cataract and eye care services within existing health systems with all stakeholders, including the private sector, for sustainability.

All NGO services involved in cataract services should engage with, and support, the existing health system through capacity and institutional building to ensure sustainability, affordability and accessibility.

Increasing investment in cataract and eye care through training of eye care workers and their retention to increase quantity and quality of workers in needy regions and the provision of facilities.

Cataract services and eye care services should be built with active community participation for cost-effectiveness, ownership and sustainability.

Cataract services should incorporate effective monitoring and quality assessment measures.

The development of more efficient and sustainable eye care systems that provide high quality and equitable services.

For remote areas, appropriate targeted outreach services that ensure sustainability should be set up.

References


III.2 Onchocerciasis and Trachoma

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Director of the International Center for Eye Health (ICEH)
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Trends in Global Blindness

Between 1975 and 1995 it is estimated that the number of blind people in the world increased from 28 to 45 million. At this time the infective eye diseases – trachoma and onchocerciasis (also called river blindness) – were major causes of blindness.

This article describes these two diseases and how recent advances in treatment are reducing the prevalence of disease and visual loss from these diseases.

Onchocerciasis

Onchocerciasis is a parasitic infection with a filarial worm called Onchocerca volvulus. The parasite is transmitted to man through the bite of a black fly called Simulium. The adult worm lives for many years in the person, often without symptoms, but produces offspring (babies) called Microfilaria. The microscopic microfilaria cause inflammation in the skin and in the eyes. The symptoms may take years to appear and include itching, redness of the eyes and gradual reduction in vision.

Onchocerciasis affects millions of people in approximately 30 countries of Africa and 6 countries of the Americas. Control of the disease was undertaken by reducing the breeding sites of the simulium fly so that transmission of the disease by the flies from person to person was reduced. This vector control in West Africa has been successful, but it is expensive and takes many years to reduce the prevalence of infection in people.

In the 1980s a drug was found which if taken once per year kills the microfilaria and reduces the symptoms of disease. The pharmaceutical company has made the drug, Ivermectin, trade name Mectizan, freely available for people with, or at risk of, onchocerciasis. The drug is given to people once a year in mass community distribution programmes, which are planned and directed by the communities themselves. Currently over 70 million people are receiving treatment annually.

Trachoma

Trachoma is a bacterial eye infection with the organism Chlamydia Trachomatis. The bacteria are transmitted from child to child by flies which are attracted to children’s eyes by facial and eye discharges. The repeated infection can carry on for months or even years, often with few symptoms. Over the course of years the inflammation produces scarring of the inside of the upper eyelid resulting in turning in of the eyelashes (trichiasis) which causes pain and gradual loss of vision from scarring of the cornea.

Trachoma affects millions of people in approximately 50 countries of Africa, Asia and the Americas. Control of the disease consist of the “SAFE” strategy which stands for “S” – surgery to turn out in turning eyelashes; “A” – mass drug administration of the antibiotic azithromycin, once per year to communities with high levels of disease (TF 10+%); “F” – promotion of facial cleanliness particularly in children to clean facial discharges away; “E” – improvement in environment, better water and sanitation.

Pfizer through the International Trachoma Initiative have made azithromycin available as a donation for the treatment of endemic trachoma communities. Currently approximately 50 million people are being treated each year.

Lessons learnt

– Drug donation programmes have played a major part in reducing infection and blindness from onchocerciasis and trachoma
– Effective distribution systems at the community level are required for the drug donations, with non-governmental agencies playing an important role in capacity building, implementation and coordination
– The affected communities play an essential role in determining how best to distribute the medicines/interventions
– Political commitment by national governments, donor agencies and pharmaceutical companies is essential to scale up these programmes both nationally and regionally
– Partnerships at international, national, district and community levels are critically important.
The gift of vision begins with a healthy eye that is capable of capturing light, focusing an image, transmitting it clearly to the retina, and converting it to an electrical signal that, on passage out of the eye by way of the optic nerve, creates an image our brain can perceive. In the center of the eye we see the vitreous, which is a large clear gel which maintains the shape of the eye, and further back, we see the retina, which lines the inside surface of the eye like wall paper. The retina is often compared to the film in a camera, and it is in the retina that the energy of the light is transformed into an electrical signal that is carried out of the eye by the optic nerve to the brain. So that we can be oriented, it is important to know that we can look into the eye and see the retina directly, and here is a normal retina shown with a special panoramic camera. The very center of the retina is known as the macula and is the area with our best visual acuity, with the remainder of the retina providing our peripheral or side vision. For comparison, you can see an eye with a large upper retinal detachment in the image slide.

The retina is one of the most elegant and complicated tissues in the human body. If we take a magnified look, we see that it is composed of multi-layered nervous tissue. In our eyes, after having passed through the front of the eye and the vitreous gel, light actually passes across the clear retina to reach one of the millions of photoreceptors, i.e., rods and cones, and it is here that the light to electric conversion takes place. These delicate photoreceptors are nourished and supported by a dedicated underlying layer of cells called the retinal pigment epithelium or RPE, and this partnership is critical to the health and function of each cell. A separation of the retina from the RPE is known as a retinal detachment, and as you might imagine, breaks the contact between these two layers and rapidly produces visual loss. The retina, although mainly clear, has blood vessels near its inner surface facing the vitreous gel, but the photoreceptors and RPE obtain their blood flow and nutrition from the choroid, a vascular layer underneath the RPE and just inside the leathery sclera of the eye.

Diseases of the retina are extremely important causes of visual loss worldwide. Because it is nervous tissue like the brain, the retina cannot be replaced or transplanted by our current treatments. There are some early and promising clinical trials using electronic chip implants, but the great majority of our work with retinal diseases consists of trying to preserve or restore the function of this very fragile and irreplaceable tissue by treatment with drugs, laser, and surgery.

Although there are many retinal diseases that are extremely important in a global perspective, I will limit my remarks to diabetic retinopathy and macular degeneration that are both in the WHO top ten list of Priority Eye Diseases. Diabetes and its complications is an enormous burden on world populations, and unfortunately it is increasing. The WHO has estimated that there were 171 million people worldwide with diabetes mellitus in 2000 and predicted that 366 million people will have diabetes by 2030. One of the most severe consequences of diabetes is the development of retinopathy, which is the most common cause of retinal blindness during the middle years of life, that is, during the most productive years of life. WHO has also estimated that in 2002 diabetic retinopathy was responsible for 5% of world’s blind, totaling approximately 5 million individuals. Indeed for much of the world’s population, it will be the ability to prevent diabetes-related visual impairment that will determine if we are successful in fighting an epidemic of retinal blindness.

Diabetes produces profound changes in the blood vessels in the retina. At first, the vessels involved may not be in the central macula, and therefore the patient may develop retinopathy while being unaware of the problem. As the disease progresses, it causes an incompetence or leakage in the inner retinal blood vessels and this is manifest as a swelling of the retina known as macular edema. You see an example in which the macula has accumulated yellow deposits of fat, and such a patient would undoubtedly be legally blind. Here you see a much earlier phase of the disease in which the blood vessels are damaged and are leaking fluid and red blood cells into the retina, indicated by the outward diffusion of bright dye during a diagnostic test in which fluorescein dye is given intravenously and then the retinal vascular leakage is detected with a special camera. This is known as non-proliferative retinopathy, and usually causes visual loss by a visually-damaging accumulation of fluid known as macular edema. A patient such as...
As diabetic retinopathy progresses, many retinal vessels become blocked, and this loss of blood flow damages the function of the affected area of the retina. These areas deprived of blood flow are called ischemic areas, and they can be demonstrated on fluorescein testing as dark patches against the light grey of areas that have continued normal circulation. Still further in the process, these dying areas of retina send biological signals to the remaining retina and a process of new blood vessels or neovascularization develops known as proliferative diabetic retinopathy. While one might be tempted to think that these new blood vessels might offer some restoration or benefit, they are highly abnormal; unless they are promptly treated, they will cause certain blindness for the eye due to bleeding into the vitreous, overgrowth of the retina with fibrovascular scar tissue, or the development of a traction retinal detachment in which the new blood vessels literally pull the retina from its needed contact with the underlying RPE. Shortly after they appear, these new vessels can be eliminated with a laser treatment known as panretinal photocoagulation, but if they progress to bleeding and retinal detachment, vision can only be restored by the most difficult and complicated vitreoretinal surgery.

What can be done to prevent diabetic blindness in the populations of the world? There are many possibilities and also many difficulties, and I will try to place these in an understandable context. We have mentioned that the incidence of diabetes itself is increasing worldwide, but in developed countries, the percentage of diabetic patients developing any form of retinopathy is actually decreasing compared to the past. This is related to improved medical management of diabetes in these countries, including better control of diet, weight, and hyperglycemia, etc., through education, drugs, exercise, and dietary modifications. This is a welcome positive trend, but we must note that no such helpful positive trend is occurring in the developing world in which the percentage of diabetic blindness is increasing directly in line with the increase in diabetes. Second, while careful medical management alone cannot reverse the damage of retinopathy, it has been clearly established that careful control of blood sugar delays or even prevents the development or progression of retinopathy. So our first and most important tasks are to improve the overall health of our populations and to provide for physician patient education, dietary modifications, drugs, and other tools so that control of blood sugar levels is improved. These are bedrock efforts, but in a world where 14% of the world’s population is undernourished and 11% lacks clean drinking water, the challenges are enormous.

Our second task relates to the detection of diabetes mellitus and therefore diabetic retinopathy. Even in a country as rich as the United States, 5.2 million diabetics are unaware that they have the disease, so we must imagine that the number of undetected patients in the world with diabetic retinopathy is truly staggering. Again, in the developing world, diabetics benefit from a yearly eye examination, but in developing countries, this will be difficult given that examiners are in short supply. Beyond the basic problem of diabetes mellitus detection itself, the best hope for improving diabetic retinopathy detection is two fold: education of more skilled examiners, and continued improvements in telemedicine in which the evaluation of diabetic retinopathy can be separated from the acquisition of diagnostic retinal photographs. If retinal photography techniques can be simplified and disseminated, such a strategy could reduce the level of medical expertise needed in remote locations.

If we could detect diabetics, and detect diabetics with visually significant retinopathy, what would be our most effective actions? Again, the difference is striking depending on the socioeconomic conditions of each country. In the United States, for example, the main problem is how to treat mild to moderate forms of macular edema, and this can usually be accomplished with intraocular injections of anti-VEGF drugs and with laser therapy. Conversely, in the developing world, untreated diabetic retinopathy most frequently presents as either extremely severe macular edema (count fingers vision or worse) or advanced and longstanding traction retinal detachments which leave the eye totally blind. A number of years ago I was demonstrating a new surgical technique in Mexico, and I planned to operate on four or five patients with severe traction retinal detachment due to diabetes. As I viewed a large crowd in the open-air waiting area of the hospital, I was amazed to learn that over one hundred patients had come hoping to be chosen for my treatment, and furthermore, that the great majority had an advanced diabetic traction detachment in both eyes!

So, our treatment options will depend on the varied socioeconomic situation of each country i.e. for more developed countries, we may have the chance to treat moderate visual loss due to macular edema with anti-VEGF drugs and laser, and perhaps even to train some surgeons to remove vitreous hemorrhage and repair a traction retinal detachment. Less developed countries will struggle with retinopathy detection, and its patients will unfortunately present with blindness due to advanced proliferative diabetic retinopathy. It is probably impractical to train the legion of skilled surgeons needed to treat such an advanced and complex condition, but if we were able to train individuals to perform prophylactic panretinal laser photocoagulation on these patients, it would be an important advance. We recently trained a retina specialist to practice in Mauritius Island in the Indian Ocean, and within his first few weeks, he had performed hundreds of such laser treatments, saving these patients from certain blindness.
So, to summarize, for more developed countries, we need to focus our efforts on diabetes control, diet, and overall health, with additional efforts at retinopathy detection and treatment including better drug treatments and training surgeons to perform relatively advanced eye surgery. For less developed nations, we will struggle with the basics of diabetes treatment and retinopathy detection, but our greatest help will be in laser treatment for proliferative retinopathy, and anything more advanced, such as intraocular drug therapy or surgery for traction retinal detachment, will unfortunately remain an exotic luxury at present.

Age-related macular degeneration presents completely different challenges and demographics compared to diabetic retinopathy. The WHO ranks it as the third most important cause of global blindness after cataract and glaucoma. Whereas diabetic retinopathy strikes middle-aged Hispanic and black populations with high frequency, age-related macular degeneration strikes patients in older age in predominantly Caucasian populations. Consequently, affected patients tend to live in countries that have more resources to detect the disease and provide therapy. The incidence is reduced in less developed countries due to a host of factors including shortened lifespan, racial and genetic predisposition, dietary habits, and many other influences that are difficult to quantify.

Age-related macular degeneration consists of two forms, namely the dry form or the wet (or neovascular) form. The dry form typically presents as the accumulation of deposits in the macula known as drusen or as an atrophic loss of tissue in the central macula known as geographic atrophy. The dry form may remain mild or may itself cause moderate central visual loss due to damage to the central retina, or in a small percentage of cases, it may progress to the wet form in which blood vessels from the choroid invade the spaces under the RPE and retina and typically cause an acute drop in visual acuity. These abnormally located vessels do severe damage to the central retina by distorting the overlying macula, by leakage that may be fluid or blood, or most severely, by creating a macular scar. In the past few years, intraocular injections of anti-VEGF agents have shown a remarkable ability to reverse the process and restore vision if administered early in the disease, but the treatment is complicated and costly, requiring sophisticated monitoring and frequent intraocular injections.

We may therefore view age-related macular degeneration as a pyramid, with the base being fully normal individuals, the middle section being those with the dry form and variable vision loss, and the very apex of the pyramid being those with wet macular degeneration. Paradoxically, we have exciting new drug treatments for the very few at the top with wet macular degeneration, but treatment of these patients will be practical or possible for only relatively well developed nations for the immediate future. Somewhat more promising are studies that have explored the factors that might influence progression from dry to wet. Smoking has been proven to be an extremely damaging risk factor for disease progression. Other studies are suggesting, but have not yet completely proved, that another risk factor for progression is the lack of a healthy diet including antioxidants, minerals, and other components such as lutein and omega 3 fatty acids. Regarding the bottom part of our pyramid and our wish to keep patients from developing any evidence of dry macular degeneration at all, unfortunately, as yet we have no preventive therapy despite an enormous amount of research and the discovery of genetic and other clues.

So, for age-related macular degeneration, we see that the most effective efforts would be preventative and would include programs to reduce smoking and perhaps to provide targeted dietary supplementation. A recent treatment of advanced ARMD, intraocular injection of less expensive medications such as bevacizumab may become within reach for more rapidly developing countries, but more widespread treatments must await cheaper, longer acting, and more easily administered forms of therapy. More readily available—and frequently overlooked—are simple high-plus glasses or magnifying low vision aids to allow improved near vision even for a patient with macular scarring.

As part of a United Nations mission, I recently spent time in the Mbola Villages cluster in Tanzania distributing reading glasses in a remote village, and I quickly learned how greatly a simple high plus pair of reading glasses was appreciated by patients with macular damage from many causes, allowing them to cook and perform other simple near tasks that were impossible without magnification.

In closing, it is clear that there are many challenges ahead in our efforts to address the suffering caused by diabetic retinopathy, age-related macular degeneration, and other forms of retina-related blindness. There have also been remarkable advances in disease prevention, detection, and treatment, ranging from the simple, such as eyeglasses, to the complex, such as advanced vitreoretinal surgery. Our greatest challenge, and greatest hope, is to identify the appropriate strategy for a given situation, and then work cooperatively and diligently to reduce retina-related blindness with the many effective prevention and interventions that are available; with effort, these tools are certain to increase in number and grow more effective in the future. Thank you again for the great honor to participate in this most important congress.

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III.4 Childhood Blindness

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Sight is the sense that gathers the most information about our environment and the only sense responsible for organizing other forms of sensory input. Considering that 80% of the information obtained during the first year of life is through sight, childhood blindness is a tragedy that will affect not only the child but also his or her family.

Childhood blindness can be prevented or treated in 40% of cases overall. However, in developing countries, 75% of childhood blindness is preventable.

Only 3% of the world’s blind populations are children. However, because children have a lifetime of blindness ahead of them, the number of “blind person years” resulting from blindness starting in childhood is second only to cataract. It is calculated that childhood blindness represents 75 million “blind years”. Fifty percent of children who become blind before the age of two years die before the age of five. This, therefore, reduces the observed prevalence of childhood-related blindness.

Childhood blindness is 10 times more frequent in the world’s poorest countries. This frequency is calculated at 0.1/1000 children aged 0-15 years in the wealthiest countries and at 1.1/1000 children in the poorest ones. Out of the 1.5 million total of blind children in the world, one million live in Asia and Africa.

Children with eye problems often require detection through the vision screening process. This generally occurs because a child that has been born with a visual problem is not aware of his or her disability and is unable to articulate to others that he or she has a visual problem. In countries where this screening does not take place on a regular basis, precious time is lost, and when the problem is eventually discovered it is often too late for adequate treatment of the illness.

A constant feature of pediatric eye illness is that the patient needs an advocate. The pediatric patient requires a special approach as does the family. Pediatric ophthalmologists or pediatric orientated ophthalmologists are better prepared to manage eye illnesses in children and have a positive attitude towards children and their families. This is why childhood blindness prevention programs are attempting to increase the number of pediatric ophthalmologists in the developing world.

The underlying causes of blindness and visual impairment in infants and children are very different compared to those observed in adult patients, as are the overall illness implications. Cataracts in children entail a much different clinical challenge than that typically encountered in adults. The surgical treatment is more complex, and even following successful cataract removal the infant must be visually rehabilitated in order to learn to see after the procedure is carried out.

To combat childhood blindness, different strategies, personnel, infrastructure and equipment than those utilized in adult patients are required. There is also much greater urgency because of the risk of developing intractable amblyopia specifically in children.

The causes of blindness in children vary widely from region to region. Corneal scarring occurring from childhood factors (including measles, vitamin A deficiency disorder, trachoma, traditional eye medicines), neonatal conjunctivitis/ophthalmia neonatorum and trauma are more commonly seen in poorer, developing countries. In more affluent regions, lesions of the brain and the central nervous system (often associated with prematurity) predominate, where as hereditary diseases are more prevalent in industrialized countries and in the Middle East. Perinatal factors, such as retinopathy of prematurity, are important in middle-income regions. Children are more susceptible to blindness from trauma in the developing world.

In developed countries where access to health care services is easier, the prevalence of acquired and congenital childhood blindness has decreased, while the prevalence of low vision associated with neurological disorders has increased due to higher survival rates among extremely premature babies.

Vitamin A deficiency disorder in children is caused by malnourishment in children in the developing world. Night blindness is one of the first signs of this pathology and can progress ultimately to xerophthalmia and complete blindness due to corneal scarring. Deficiency of this vitamin also lowers resistance to infection. The mortality rate can exceed 50% in children with severe vitamin A deficiency. This disease is easily prevented by either oral or injectable supplementation of vitamin A.

Cataract is responsible for 10-20% of all childhood blindness, and the relative incidence of cataract as a cause of visual impairment in children is increasing due to the decrease of other causes including vitamin A deficiency. It affects 3 per 10,000 children but this incidence increases to 15 per 10m000 children in the developing world due to poor control of perinatal infections, metabolic illnesses, consanguinity and trauma.

Cataracts in children are due to many different causes, the most common including inherited tendency, perinatal infections, metabolic disease and trauma. Cataracts can manifest at birth or develop during childhood. Cataracts that affect vision should be removed as early as possible in order to prevent interference with
The prevalence of blindness due to retinopathy of prematurity varies significantly among countries and depends upon the level of neonatal care (in terms of access and neonatal survival) and also upon the availability of effective screening and treatment programs. It has recently become one of the most important causes of childhood blindness in middle-income countries, in which access to neonatal care has improved without the implementation of adequate screening and treatment programs for controlling the condition.

The population of infants who develop severe retinopathy of prematurity in highly developed countries differs from those who are affected in less well developed countries where larger, more mature, infants can be severely affected.

In order to prevent visual impairment due to this pathology, several measures are being implemented, including better control of oxygen saturation levels in infants at risk, training of ophthalmologists to work with neonatologists and nurses in screening programs, development of new forms of treatment of the illness and exploring innovative methods of screening using non-medical personnel and telemedicine.

Economic development and specific interventions are changing the patterns of blindness in children all over the world. Improved coverage of measles immunization and programs for the control of vitamin A deficiency and trachoma are both reducing corneal blindness in many low-income countries. As a result, cataracts are becoming a more important cause of childhood visual impairment.

Retinopathy of prematurity remains a very important cause of childhood blindness with increasing incidence noted in less developed countries.

Childhood blindness constitutes one of the biggest challenges in terms of prevention and treatment in the global health arena. In order to obtain significant results in reducing preventable childhood blindness, governments, especially those in the developing world, should make this a priority and focus on the necessary resources in order to diminish preventable childhood blindness effectively.

III.5 Errori Refrattivi

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Refractive Errors
Refractive errors are the first cause of preventable poor sight in the world and affect over 500 million people. 90% of the burden of uncorrected refractive errors falls on poor countries because of a lack of infrastructures, health-care personnel, instruments and optic centres. The pathogenesis of refractive defects involves both genetic and environmental components which are currently being identified. Refractive defects can be classified into four categories: myopia, hyperopia, astigmatism and presbyopia. Myopia is caused by an excessive growth of the eyeball. The prevalence of myopia increases in families that move from a rural context to the cities and is directly correlated with study activity, a reduced exposure to sunlight, and a greater availability of food and fats. Hyperopia, which is caused by a reduced size of the eyeball, and astigmatism, are found to a greater extent in children brought up in weak socio-economic conditions, such as the African populations of the sub-Saharan regions but also the inhabitants of poor neighbourhoods in England. Presbyopia, which is caused by an ageing of the eye’s lens, is responsible for visual disability above all in middle-low income throughout the world.

The potential loss of productivity derived from the burden of uncorrected refractive errors is estimated at 26 milliard dollars. The cost of providing a pair of spectacles to those who need them is estimated to be 26 milliard dollars.

A normal development of the visual system.

In developing countries cataract surgery is not usually performed by surgeons with special training in pediatric cataract surgery and many are not performed in tertiary care centers. This leads directly to poor results following cataract surgery in children from these countries. The follow-up of these patients is often deficient with a subsequent difficulty in obtaining adequate visual rehabilitation. All this occurs with poor overall care of pediatric patients with cataracts and explains why cataracts are still a very important cause of visual impairment in children in the developing world.

Retinopathy of prematurity is a potentially blinding pathology which is caused by the abnormal development of retinal blood vessels in premature infants. Most cases resolve without permanent damage to the retina, but more severe cases can lead to retinal detachment and result in blindness or severe visual impairment. The most important risk factors for the development of this illness are low birth weight and prematurity.

The prevalence of uncorrected refractive errors falls on poor countries because of a lack of infrastructures, health-care personnel, instruments and optic centres. The pathogenesis of refractive defects involves both genetic and environmental components which are currently being identified. Refractive defects can be classified into four categories: myopia, hyperopia, astigmatism and presbyopia. Myopia is caused by an excessive growth of the eyeball. The prevalence of myopia increases in families that move from a rural context to the cities and is directly correlated with study activity, a reduced exposure to sunlight, and a greater availability of food and fats. Hyperopia, which is caused by a reduced size of the eyeball, and astigmatism, are found to a greater extent in children brought up in weak socio-economic conditions, such as the African populations of the sub-Saharan regions but also the inhabitants of poor neighbourhoods in England. Presbyopia, which is caused by an ageing of the eye’s lens, is responsible for visual disability above all in middle-low income throughout the world. The potential loss of productivity derived from the burden of uncorrected refractive errors is estimated at 26 milliard dollars. The cost of providing a pair of spectacles to those who need them is estimated to be 26 milliard dollars.
La visione sfuocata ha un drammatico peso viene portato alla luce solo nel Report OMS del 2008 che li riconosce come la principale causa di ipovisione e la seconda causa di cecità al mondo. Come si giustifica questo? La stima della prevalenza dell’ipovisione si è enormemente estesa nel 2008 variando i criteri di inclusione precedentemente adottati: da “visione con la migliore correzione ottica” (best corrected) a “visione rilevata al momento della visita” (presenting vision) vale a dire la visione naturale o con la correzione in uso, se presente. La visione rilevata alla visita fornisce realisticamente la vera prevalenza dell’ipovisione, parte della quale può essere risolta con la correzione ottica. I difetti refrattivi costituiscono un grave problema di salute pubblica. La ipovisione è corresponsabile della povertà, in un circuito patologico che associa la mancanza considerazione del problema (spesso i genitori sono a conoscenza che il loro figlio è ipove- dente) i pregiudizi culturali che fanno ritenere l’uso degli occhiali un indebolimento per la vista, le difficoltà all’acquisto ed alla fornitura di occhiali per barriere economiche e organizzative. Prendiamo in considerazione 1) la definizione, 2) l’epidemiologia, 3) il peso economico degli errori refrattivi.

1. Definizione e classificazione degli errori refrattivi

L’occhio è un sistema ottico in cui due lenti – la cornea ed il cristallino – mettono a fuoco sulla retina i raggi luminosi provenienti da un oggetto posto in distanza. Si definisce errore refrattivo la condizione in cui i raggi luminosi – in assenza di accomodazione – non sono messi a fuoco sulla retina, causando una visione sfocata. Se i raggi sono focalizzati davanti alla retina si parla di miopia, se i raggi sono focalizzati oltre la retina si parla di ipermetropia. Se i raggi sono messi a fuoco in più di un piano focale, a causa di una curvatura diversa della cornea nei meridiani orizzontale e verticale, si parla di astigmatismo. La presbiopia invece è un problema causato dall’invecchiamento della lente interna dell’occhio, il cristallino, che con l’età perde la naturale elasticità e quindi la capacità di accomodare. La presbiop- pia colpisce indistintamente tutte le persone a partire dall’età di 40-45 anni. Le persone con iper- metropia o emmetropia (assenza di errori refrattivi) dopo quell’età hanno difficoltà nella lettura, mentre i miopi sono spesso ancora in grado di farlo senza corre- zione, in relazione al grado della miopia stessa.

Definiamo: MIOPIA un difetto minore o uguale a -0.50 diottrie nei bambini e -1 diottrie negli adulti.

IPERMETROPIA un difetto maggiore di +2 diottrie.

ASTIGMATISMO un difetto maggiore di 0.75 diottrie.

IPOVISIONE (visual impairment) una visione non corretta inferiore a 3.3/10 (6/18) nell’occhio migliore. Questo limite va innalzato a 5/10 (6/12) nei bambini in età scolare.

2. Epidemiologia degli errori refrattivi

L’occhio umano cambia dimensioni e caratteristiche ottiche durante la crescita. La lunghezza assiale aumenta rapidamente dai primi mesi di vita, (da 16.8 a 23.6 mm in età adulta), e la curvatura corneale diminuisce, consentendo all’occhio di mantenere una corretta messa a fuoco. Il processo di crescita sincronizzato delle tre principali componenti refrattive dell’occhio (cornea, cristallino, lunghezza assiale) è chiamato “emmetropizzazione”, e porta idealmente a un difetto refrattivo pari a zero. In ogni popolazione...
una percentuale di bambini non riesce a raggiungere l’emmetro- pia, o la perde durante il periodo scolare. Il permanere di difetti re- frattivi congeniti quali l’ipermetropia o l’astigmatismo, o la par- comparsa di difetti quale la miopia sono regolati da fattori genetici ed ambientali.

A partire dagli anni ’90 stu- di epidemiologici di popolazione hanno messo in luce il fatto che il carico globale dei difetti refrattivi di una popolazione varia a se- condà dell’età e delle regioni ge- ografiche. Il fondamentale studio “Errori refrattivi nei bambini”17 – sostenuto dall’OMS nel 2000 – ha posto a confronto i dati rilevati in campioni rappresentativi di bam- bini dai 5 ai 15 anni in tre Paesi: Cina, Tibet e Cile. È emer- so che il 12% dei bambini cinesi aveva difetti di vista – principalmente miopia, in Tibet il 3%, in Cile il 15%, principalmente astig- matismo elevato.

Nei primi anni di vita i fattori genetici giocano un iniziale ruo- lo predominante nel determinare i difetti refrattivi. Uno studio20 con- dotto nel 2010 su 38.000 bambi- ni rappresentativi di 8 popolazioni conferma che in India, Nepal, Sud Africa e Cile il difetto prevalente a tutte le età era una lieve ipermetro- pia, che diveniva a 15 anni miopia in meno del 20% dei casi. Al con- trario, in Malesia e Cina (rurale e urbana) a 15 anni la miopia riguar- dava più del 35% dei casi.

La prevalenza dei difetti visi- vi non è costante nel tempo, ma è influenzata da fattori ambientali. Analizziamo i più recenti contri- buti della letteratura in proposito.

2a. Miopia

La miopia rappresenta un pro- blema sociale di salute in quan- to causa ipovisione e può ave- re complicazioni sino alla cecità. Inizialmente caratterizzata nel 1600 da Kepler e Newton come un problema di focalizzazione dei raggi luminosi davanti alla retina, è stata associata dal 1800 ad una eccessiva crescita il lunghezza della retina e della cornea. Numerose ipo- tesi sono state avanzate negli anni per capire se prevalgono in questa crescita fattori genetici ed ambientali, in relazione alla scolarità e al lavoro da vicino. Esperienze su modelli animali hanno confermato che la crescita dell’occhio è sicuramente influenzata dalla qualità dell’im- magine retinica. Chi studia ha un maggiore rischio di miopia a causa della sfocatura delle immagini in- dotta sulla retina dalla vicinanza del libro.

La prevalenza di miopia è si- gnificativamente più alta in aree urbane rispetto ad aree rurali. Questo emerge con chiarezza in studi condotti in Cina. Fan9 confronta la prevalenza di miopia rilevata in bambini di asilo di Hong Kong nel 1997 e nel 2007, e trova un aumento dal 2.3% al 6.3%. Shih10 trova una progressione della miopia in ma- schi e femmine di 0.24/0.31 diot- trie per anno in ambito rurale, 0.43 e 0.50 diotto per anno in ambito urbano. Lam11 confronta la preva- lenza di miopia rilevata nel 1990 e nel 2010 a Hong Kong in bambi- ni, e pur trovando percentuali sostanzialmente stabili di miopia nel tempo (25% contro il 18% a 6 anni, 64% contro 61% a 12 anni) conferma in città una prevalenza di miopia più che doppia rispetto all’area rurale. Zhang12 trova una correlazione positiva tra presenza di miopia, densità di popolazione e lavoro da vicino. Lim13 in bambi- ni di 12 anni di Singapore trova una associazione tra miopia, mag- gior lunghezza assiale del globo e dieta più ricca di acidi grassi satu- ri e colesterolo. Wu14 studia l’in- fluenza di attività all’aperto sullo sviluppo della miopia in bambini di 7-12 anni, e trova una signifi- cativa associazione diretta tra au- mento della miopia, anni di studio e familiarità, mentre trova una as- sociazione inversa tra miopia ed attività all’aperto.

La tendenza si conferma an- che in altre popolazioni. In India a Hyderabad15 la prevalenza di miopia risulta significativamente maggiore in bambini di età scola- re in ambito urbano (51%) rispet- to al rurale (17%). Uno studio di prevalenza condotto negli Stati Uniti in persone dai 12 ai 54 an- ni mostra negli ultimi 30 anni un aumento della prevalenza passata dal 25% nel 1972 al 41.6% nel 2004. Le stime di prevalenza della mio- pia variano anche in relazione al- la razza: i neri sono passati dal 13% al 33%, i bianchi dal 26.3% al 43%16. Rudnicka17 conferma una differenza etnica sulla preva- lenza di miopia in bambini di 11 anni di scuole inglesi. La preva- lenza variava dal 25% negli asi- tici al 10% negli africani caraibi- ci al 3.2% negli europei bianchi.

A parità di ambiente geografico e di quantità di studio, differenze di prevalenza della miopia sono cor- relate a differenze etniche nella grandezza del globo oculare. La prevalenza della miopia massima (78.4%) è stata trovata in bambini cinesi di 15 anni di città18, e mini- ma (1.2%) in bambini nepalesi di 5-15 anni in area rurale6.

Questi dati in qualche mo- do rappresentano un ritorno al- le indicazioni di “igiene visiva” dei primi oculisti dell’ottocento, quando si raccomandava di avere una buona illuminazione possibil- mente naturale, mantenere la po- sizione eretta studiando ed evitare l’inclinazione del capo in avanti che era creduta produrre “conge- stione oculare” e distensione del globo19.

2b. Astigmatismo e ipermetropia

L’astigmatismo è un difetto re- frattivo dovuto alla diversa curva- tura dei principali meridiani cor- niali. È presente alla nascita, e di norma nei primi 18 mesi di vita si riduce spontaneamente20. Se è di origine genetica, permane per tutta la vita. L’eredità del difetto è di tipo autosomico dominante21, e presenta marcate differenze etni- che. In Sud America, lungo la cor- digliera andina, la prevalenza di astigmatismo elevato > 2 diottrie colpisce dal 12 al 15% dei bambi- ni. Prevalenze elevate di astig- matismo sono segnalate anche in altre popolazioni. Fozailoff22 con- duce uno studio in bambini afro- americani e ispanici dai 6 ai 72 mesi in California, e trova una prevalenza di astigmatismo mag- giore nei bambini ispanici (16.8 vs 12.7%), con una tendenza alla riduzione con l’età. Rezvan23 stu- dia bambini dai 6 ai 17 anni nel nord Iran e trova l’11.5% di casi con astigmatismo, contro il 4.3% di miopia ed il 5.4% di ipermetro- pia. La presenza di astigmatismo si associa ad un rischio 4.6 volte più alto di sviluppare una miopia,
ed una capacità visiva più bassa\(^24\). Oltre all’influenza genetica, sono state trovate associazioni tra la deprivazione socio-economica e la presenza di ipermetropia ed astigmatismo nella popolazione. L’indice di deprivazioni multiple, ottenuto misurando diversi campi socio-economici e correlando li con la località dove è vissuto il bambino ha mostrato in bambini inglesi una associazione lineare tra lunghezza assiale più corta, ed astigmatismo più elevato\(^25\).

Correla con queste osservazioni lo studio di prevalenza dei difetti refrattivi condotto in bambini dai 6 ai 16 anni in Burkina Faso. La miopia è stata trovata solo nel 2.5% dei casi, l’ipermetropia nel 17.1% e l’astigmatismo nell’11.7% dei casi\(^26\).

In Marocco, uno studio di bambini della stessa età ha mostrato dati simili: miopia 6.1%, ipermetropia 18.3%, astigmatismo 23.5%\(^27\).

In conclusione, gli studi più recenti mostrano l’aumento della prevalenza di miopia nei bambini le cui famiglie si stanno dal contesto rurale verso la città. La crescita della lunghezza assiale causa di miopia correla direttamente con l’attività di studio, la ridotta esposizione alla luce solare, la maggiore disponibilità di cibo e di grassi. Al contrario, una ridotta dimensione del globo oculare ed un astigmatismo più elevato si trova nei bambini in condizioni socio-economiche più deboli, come le popolazioni africane nelle regioni sub-sahariane, ma anche gli abitanti dei quartieri poveri in Inghilterra.

2c. Presbiopia

La presbiopia, che necessita di occhiali correttivi per vicino, è stata a lungo considerata “non così importante” a causa della presunzione che gli occhiali da lettura sono generalmente poco costosi e facilmente disponibili. Tale difetto non è stato neppure inserito nella attuale definizione di ipovisione. Si è “dimenticato” di considerare un problema che riguarda oltre 1 miliardo di persone nel mondo (2005) delle quali 517 milioni (49%) non hanno nessuna correzione o una correzione inadeguata\(^28\). Il WHO Bulletin indica la presbiopia come un problema di salute significativo, con potenziali conseguenze negative sulla produttività e qualità di vita dei soggetti affetti. La crescita della popolazione mondiale e l’aumento dell’età proiettano questo studio ulteriormente in alto. Il peso di questa situazione ricade nel 90% sui Paesi poveri\(^29\).

Marlamula\(^30\) riporta i risultati di uno studio di popolazione sulla prevalenza dei difetti visivi non corretti condotto l’Andhbra Pradesh, India. Il 67% dei soggetti sopra i 35 anni presentava problemi di presbiopia, la copertura con occhiali era del 19%. In un ulteriore studio\(^31\) condotto in comunità costiere di pescatori in India la correzione della presbiopia riguardava solo l’11% dei soggetti. Uno studio condotto in Nigeria\(^32\) ha mostrato la presbiopia come più comune errore refrattivo (35%) seguita dall’astigmatismo (19.7%) e dall’ipermetropia (22.7%). Solo il 4.9% aveva miopia. La correzione con lenti ha ridotto l’ipovisione del 90% nella comunità. In uno studio condotto a Zanzibar\(^33\) la prevalenza di presbiopia in pazienti sopra i 50 anni era dell’89%: solo il 17.6% aveva occhiali. Al follow-up dopo 6 mesi dalla fornitura di una correzione il 93% aveva ancora in uso gli occhiali e dichiarava significativamente migliorato la propria qualità di vita.

3. Peso economico degli errori refrattivi

Uno studio sulla ineguaglianza della distribuzione della salute oculare prende in considerazione la somma di DALYs (disability-adjusted life years) relativi a cataratta, tracoma, glaucoma, deficit di vitamina A, errori refrattivi e maculopatia. Il carico globale delle malattie oculiari è stato stimato da 61,4 milioni di DALYs, il 4% del totale\(^34\).

Gli errori refrattivi forniscono il maggior contributo alla disabilità visiva nelle classi a medio-basso reddito in tutto il mondo. La tassativa mediana di produttività che risulta dal carico degli errori refrattivi non corretti è stimata in 268.8 miliardi di dollari\(^35\). Il costo per provvedere a tutte le persone che ne hanno bisogno un paio di occhiali prevedendo un ricambio ogni 3 anni al prezzo di 150 dollari è stato calcolato in 26 miliardi: dieci volte meno del danno economico teoricamente ipotizzato. In realtà, molti beni di consumo inclusi gli occhiali – non rappresentano spese sostenibili per i settori più poveri di ogni società. A sostegno di questa constatazione, l’ipovisione e la cecità colpiscono in modo sproporzionatamente maggiore persone povere senza istruzione e le donne.

La scarsa copertura di servizi refrattivi è la regola in aree rurali. I seguenti fattori sono chiamati in causa: costi, mancata percezione del bisogno, mancanza di accesso ai servizi. La domanda e la percentuale d’uso di occhiali è ulteriormente ridotta da pregiudizi sociali o estetici, dal preconcetto che l’uso degli occhiali indebolisca la vista, o dalla semplice ignoranza dell’esistenza di un difetto di vista.

**Conclusioni**

Abbiamo quindi oggi se si può dire “impossibile alcufo” meglio il quadro complessivo. L’attuale scenario preoccupante può migliorare rapidamente attraverso una serie di iniziative coordinate, come è già avvenuto nei primi 10 anni della campagna ‘Vision 2020’ per altre cause di cecità e ipovisione, quali la cataratta e il tracoma.

C’è bisogno di occhiali prefabbricati a basso costo, di produzione locale di occhiali, di sviluppo di nuovi strumenti per la misura della refrazione che siano economici, solidi, usabili a distanza, possibilmente senza l’uso di coltello ciclopietico.

L’evoluzione della tecnologia ci aiuta. La misura degli errori refrattivi si faceva con lo schiaccio, piccolo strumento che richiude una stima soggettiva del difetto, e che comporta difficoltà nella misura dell’astigmatismo e dei difetti elevati. Dal 1980 lo schiaccio è stato affinato e progressivamente sostituito da refrattometri automatici, strumenti che forniscono una misura del difetto refrattivo. I refrattometri
avevano ed hanno il difetto di essere costosi, ingombranti e dipendenti dall’energia elettrica; nel 1995 è stato introdotto il primo refrattometro portatile a batteria. Alla fine degli anni ’80 sono stati introdotti nuovi refrattometri binoculari, più adatti allo studio dei difetti visivi pediatrici in quanto utilizzati alla distanza di 1 metro; questi strumenti saranno presto disponibili a batteria, portatili e quindi più adatti all’uso anche in contesti rurali.

Con i nuovi mezzi che abbiamo a disposizione si deve formare più personale addestrato per lo screening visivo, per la cura degli occhi, per la misura della refrazione e per la fabbricazione / distribuzione di occhiali.

I Governi, le Organizzazioni internazionali, le Associazioni professionali, l’Industria Ottica, la Chiesa devono mette in campo le loro energie. Eliminare l’ipovisio ne da difetti refrattivi non corretti è la sfida che vogliamo raccogliere e vincere!.

Bibliografia